

In Re Patent Application of:
STORM ET AL.
Serial No. 10/820,464
Filing Date: April 8, 2004

In the Claims:

Claims 1-13 (Cancelled).

14. (Currently Amended) An image sensor comprising:
an array of pixels, each pixel comprising

a photodiode,

a first output circuit for deriving a linear
output signal by applying a reset signal to said
photodiode and reading a voltage on said photodiode
after an integration time, and

a second output circuit for deriving a
logarithmic output signal by reading a near
instantaneous illumination-dependent voltage on said
photodiode that is a logarithmic function of the
~~illumination~~ illumination,

said first and second output circuits
sequentially providing the linear and logarithmic
output signals, and

an output selection circuit for selecting
between the linear output signal and the logarithmic
output signal as an output signal, with the linear
output signal being selected when greater than a
predetermined value.

15. (Currently Amended) The An image sensor according
to Claim 14, wherein said first output circuit comprises:

a reset switch for applying a reset voltage to said
photodiode, said reset switch comprising a reset transistor

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including a conducting terminal connected to said photodiode; and
a readout switch for turning on the conducting terminal
of said reset transistor after expiration of the integration
time.

16. (Currently Amended) The ~~An~~ image sensor according
to Claim 14, wherein said second output circuit comprises:
an amplifier; and
a log select switch for connecting said amplifier to
said photodiode.

17. (Currently Amended) The ~~An~~ image sensor according
to Claim 16, wherein said amplifier comprises a differential
amplifier having an inverting input connected to the conducting
terminal of said reset transistor, and a non-inverting input
connected to a reference voltage.

18. (Currently Amended) The ~~An~~ image sensor according
to Claim 14, further comprising a calibration circuit for
calibrating each pixel before deriving the logarithmic output
signal.

19. (Currently Amended) The ~~An~~ image sensor according
to Claim 18, wherein said calibrating circuit comprises a
constant current source selectively connected to each respective
pixel.

20. (Currently Amended) The ~~An~~ image sensor according

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to claim 19, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic output signals are derived from the output node, said calibration circuit further comprising a switch connected between said photodiode and the output node for isolating said photodiode from the output node while calibration takes place.

21. (Currently Amended) An image sensor comprising:
an array of pixels, each pixel comprising

a photodiode,

a first output circuit connected to said photodiode for generating an output signal to be a linear output signal, and

a second output circuit connected to said photodiode for generating the output signal to be a logarithmic output ~~signal~~ signal,

said first and second output circuits
sequentially providing the linear and logarithmic
output signals, and

an output selection circuit for selecting
between the linear output signal and the logarithmic
output signal as the output signal, with the linear
output signal being selected when greater than a
predetermined value.

22. (Currently Amended) The ~~An~~ image sensor according to Claim 21, wherein the linear output signal is selected if the pixel has not saturated during generation of the linear output

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signal, otherwise, the logarithmic output signal is selected.

23. (Currently Amended) The ~~An~~ image sensor according to Claim 21, wherein said first output circuit derives the linear output signal by applying a reset signal to said photodiode and reading a voltage on said photodiode after an integration time.

24. (Currently Amended) The ~~An~~ image sensor according to Claim 21, wherein said second output circuit derives a logarithmic output signal by reading a near instantaneous illumination-dependent voltage on the photodiode that is a logarithmic function of the illumination.

25. (Currently Amended) The ~~An~~ image sensor according to Claim 21, wherein said first output circuit comprises:

a reset switch for applying a reset voltage to said photodiode, said reset switch comprising a reset transistor including a conducting terminal connected to said photodiode; and

a readout switch for turning on the conducting terminal of said reset transistor after expiration of the integration time.

26. (Currently Amended) The ~~An~~ image sensor according to Claim 21, wherein said second output circuit comprises:

an amplifier; and

a log select switch for connecting said amplifier to said photodiode.

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27. (Currently Amended) The ~~An~~ image sensor according to Claim 26, wherein said amplifier comprises a differential amplifier having an inverting input connected to the conducting terminal of said reset transistor, and a non-inverting input connected to a reference voltage.

28. (Currently Amended) The ~~An~~ image sensor according to Claim 21, further comprising a calibration circuit for calibrating each pixel before deriving the logarithmic output signal.

29. (Currently Amended) The ~~An~~ image sensor according to Claim 28, wherein said calibrating circuit comprises a constant current source selectively connected to each respective pixel.

30. (Currently Amended) The ~~An~~ image sensor according to Claim 29, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic output signals are derived from the output node, said calibration circuit further comprising a switch connected between said photodiode and the output node for isolating said photodiode from the output node while calibration takes place.

31. (Currently Amended) A method for operating an image sensor comprising an array of pixels, each pixel comprising a photodiode, the method comprising:

deriving a linear output signal from each pixel;

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deriving a logarithmic output signal from each pixel,
with the linear and logarithmic output signals being sequentially
derived; and

selecting between the linear output signal and if the
pixel has not saturated during generation of the linear output
signal, otherwise, selecting the logarithmic output signal as an
output signal, with the linear output signal being selected when
greater than a predetermined value.

32. (Currently Amended) The A method according to
Claim 31, wherein deriving the linear output signal from each
pixel comprises:

applying a reset voltage to the photodiode;
allowing for a predetermined integration time; and
reading an output voltage on the photodiode.

33. (Currently Amended) The A method according to
Claim 31, wherein deriving the logarithmic output signal is based
upon reading a near instantaneous illumination-dependent voltage
on the photodiode that is a logarithmic function of the
illumination.

34. (Currently Amended) The A method according to
Claim 31, further comprising calibrating each pixel before
generating the corresponding logarithmic output signal.

35. (Currently Amended) The A method according to
Claim 34, wherein each pixel is calibrated by applying a constant

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current thereto.

36. (Currently Amended) The A method according to Claim 35, wherein an output node is associated with each photodiode, and wherein the linear and logarithmic outputs are generated with respect to the output node, and a calibration circuit comprising a switch is connected between the photodiode and the output node for isolating the photodiode from the output node while calibration takes place.